Quadratic regression Calculator

Analyzes the data table by quadratic regression and draws the chart.

Quadratic regression: $y=A+Bx+Cx^2$

(input by clicking each cell in the table below)

data

No.	x	y
1	302.20398553634334	0.43460552002626957
2	401.9088595421428	0.36869450645195767
3	505.31795273644065	0.3232390409347363
4	598.0471976105778	0.2944744498230481
5	701.7038286703822	0.2697443649870472
6	809.2217409292141	0.25118864315095807
7	905.4157189380937	0.2377882968026018
8	999.999999999999	0.22758459260747893
9	1987.519712084896	0.1665054953069651
10	3009.0126602227697	0.1412537544622755
11	4001.763393264597	0.12451970847350334
12	4966.609758663147	0.11343887340720292
13	5954.691781536963	0.1033441063880557
14	6986.789735577608	0.09729605646212959
15	7953.583627213136	0.0911011395688753
16	8937.571151054222	0.0862410996895277
17	9956.892709017235	0.08208914159638261

(Inc/Dec of the row)

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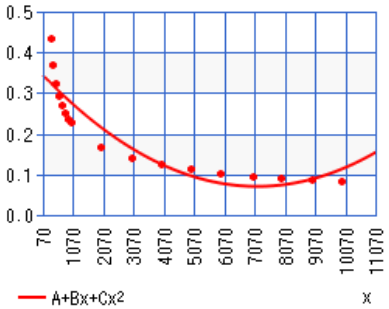
function	value
mean of x	3,469.309048
mean of y	0.2007711053
correlation coefficient r	0.9276025204
A	0.347227125
B	-7.76835389E-5
C	5.44660788E-9



Guidelines for interpreting correlation coefficient r :

0.7＜|r|≦1 strong correlation
0.4＜|r|＜0.7 moderate correlation
0.2＜|r|＜0.4 weak correlation
0≦|r|＜0.2 no correlation

Quadratic regression

(1) *mean*: $\overline{x}=\frac{\sum x_i}{n}$, $\overline{y}=\frac{\sum y_i}{n}$ $\overline{x^2}=\frac{\sum x_i^2}{n}$

(2) *trend line*: $y=A+Bx+Cx^2$

$$B=\frac{Sxy\,Sx^2x^2-Sx^2y\,Sxx^2}{Sxx\,Sx^2x^2-(Sxx^2)^2}$$

$$C=\frac{Sx^2y\,Sxx-Sxy\,Sxx^2}{Sxx\,Sx^2x^2-(Sxx^2)^2}$$

$$A=\overline{y}-B\overline{x}-C\overline{x^2}$$

(3) *correlation coefficient*:

$$r=\sqrt{1-\frac{\sum(y_i-(A+Bx_i+Cx_i^2))^2}{\sum(y_i-\overline{y})^2}}$$

$$S_{xx}=\frac{\sum(x_i-\overline{x})^2}{n}=\frac{\sum x_i^2}{n}-\overline{x}^2$$

$$S_{xy}=\frac{\sum(x_i-\overline{x})(y_i-\overline{y})}{n}=\frac{\sum x_iy_i}{n}-\overline{x}\overline{y}$$

$$S_{xx^2}=\frac{\sum(x_i-\overline{x})(x_i^2-\overline{x^2})}{n}=\frac{\sum x_i^3}{n}-\overline{x}\overline{x^2}$$

$$S_{x^2x^2}=\frac{\sum(x_i^2-\overline{x^2})^2}{n}=\frac{\sum x_i^4}{n}-\overline{x^2}\overline{x^2}$$

$$S_{x^2y}=\frac{\sum(x_i^2-\overline{x^2})(y_i-\overline{y})}{n}=\frac{\sum x_i^2y_i}{n}-\overline{x^2}\overline{y}$$